EXHIBIT 6
[UNREDACTED VERSION OF DOCUMENT SOUGHT TO BE SEALED]

Best in Class 5 year service life Initiative

Tech Review Presentation
Oct 10 2012

from a whole lot of dedicated Seagate employees

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Agenda

1. Introduction - Sai
   1. What is 5 year service life ?
   2. Why do we need this ?
2. Approach and Strategy –Sai
   3. Bath tub
   4. Critical Modes
   5. Service life in X-Y axis.. (Time and Space)
3. Validation Process – Rich Segar
   6. Validation Philosophy
   7. Alignment to PDP
   8. Alignment to upstream functions
4. Failure Mode improvement Roadmap - Catalin
5. Reliability model consolidation process – Andrei
6. Today's subsystem five year service life design & validation process
   9. HDM – Bob German and Bob Turner
   10. Mechanical – Mark Dube and Mo Xu
   11. VISE – Mike Miller

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Service life vs MTBF vs Warranty

Service life

A product's service life is its <u>expected lifetime</u>, or the acceptable period of use in service. It is the time that any manufactured item can be expected to be 'serviceable'. Service life is a unique commitment made by the item's manufacturer.

MTBF

MTBF is manufacturer's <u>estimate of a failure rate</u> during mission fulfillment. It is predicting the probability of failure within the service life.

Warranty

Warranty is an assurance by manufacturer to customer that specific performance is true or will happen. Customer is permitted to rely on that assurance and <u>seek some type of remedy</u> if it is not true. There are no direct legal and financial ramification if predicted MTBF or service life does not come true, unless it is specified in warranty document.

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Service life measures as seen by customer

Segment	Mission time	Service life	MTBF	total FR over 5yr life	Warranty
XYZ missile system	1 minute	20 years	20 minutes	5.00%	X years
Tier-0 SSD	24hrs a day	5 years	2.0 million	2.20%	5 years
Mission Critical HDD	24hrs a day	5 years	2.0 million	2.20%	5 years
Nearline HDD	24hrs a day	5 years	1.4 million	3.12%	5 years
Nearline-Lite HDD	24hrs a day	5 years	0.8 million	5.45%	3 years
DVR HDD	24hrs a day	5 years	2.0 million	2.20%	3 years
NB & DT OEM HDD	8 hrs a day	5 years	0.5 million	2.40%	3 years
NB & DT Disty HDD	8 hrs a day	5 years	0.5 million	2.40%	2 years
SBS Backup HDD	2 hrs a day	5 years	0.1 million	3.70%	1-2 year

1. Above MTBF and warranty goals as committed by Seagate for products shipping starting July 01 2012.

2. Request for all teams to align to the above five year performance measures
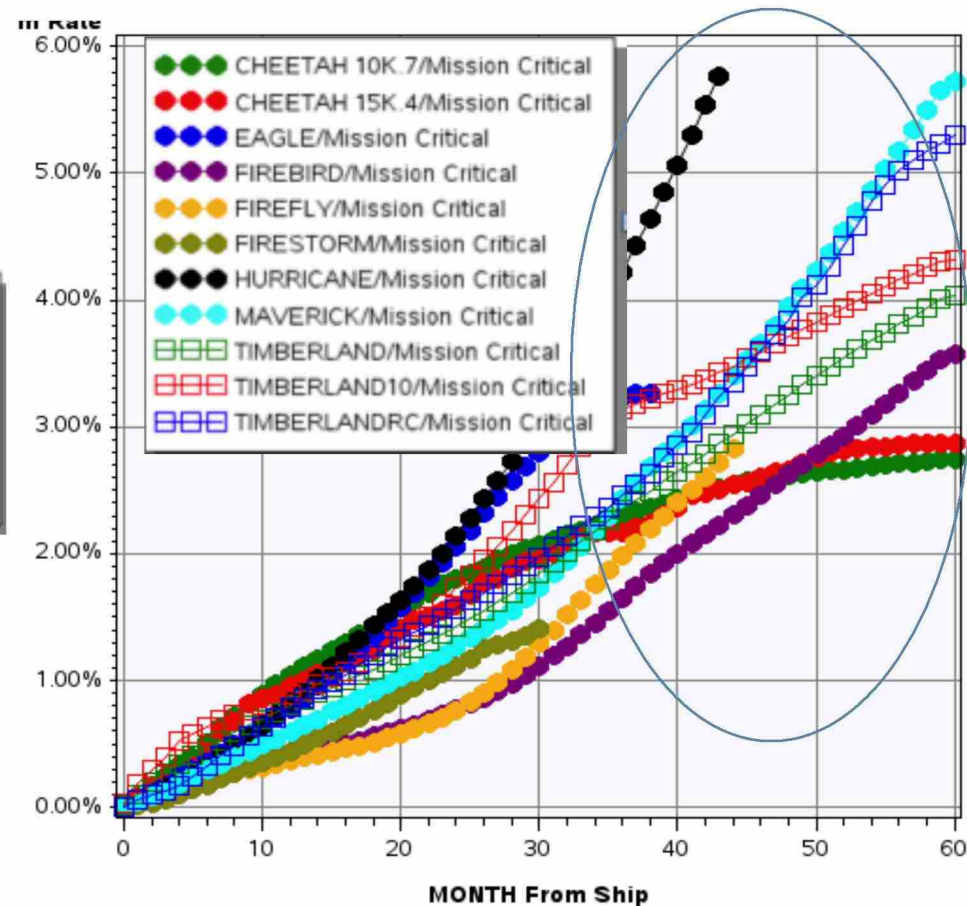
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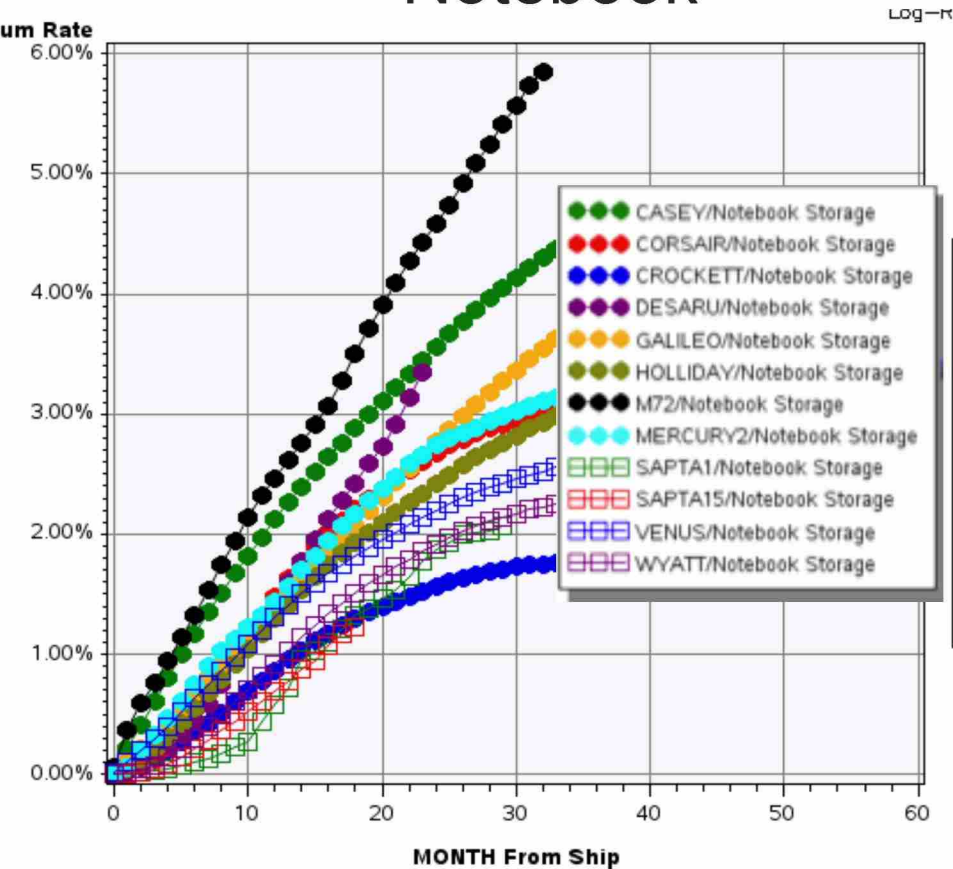# ES field return rates *(all customers combined)*

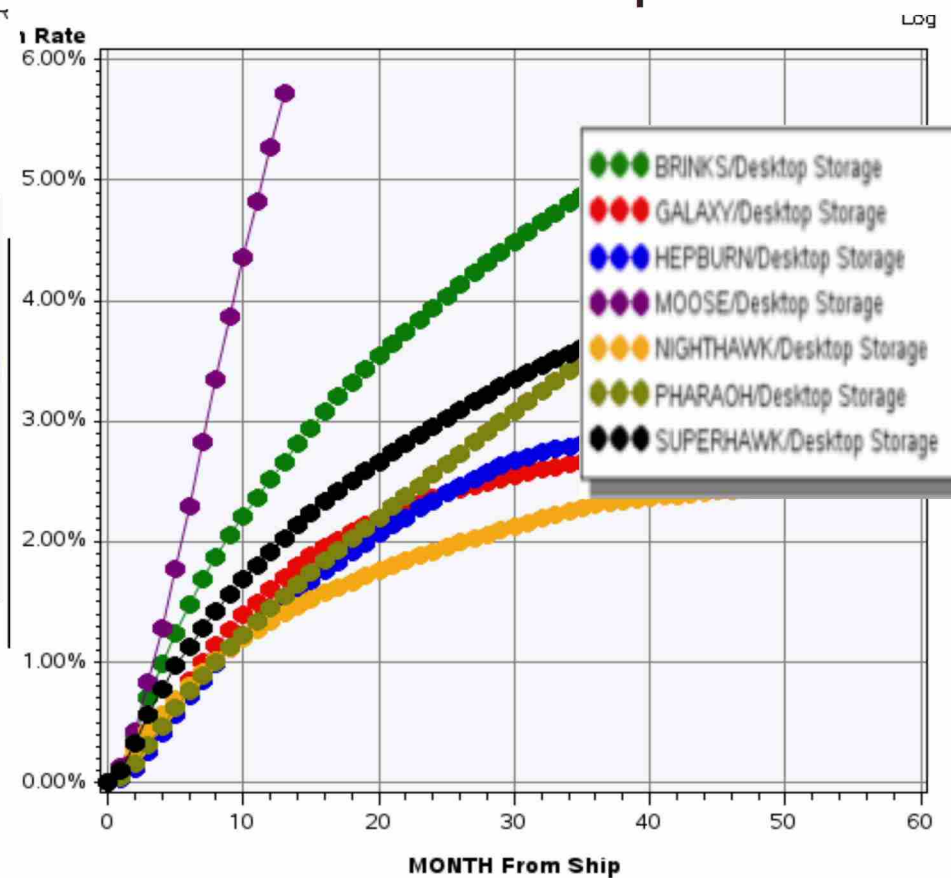## Nearline
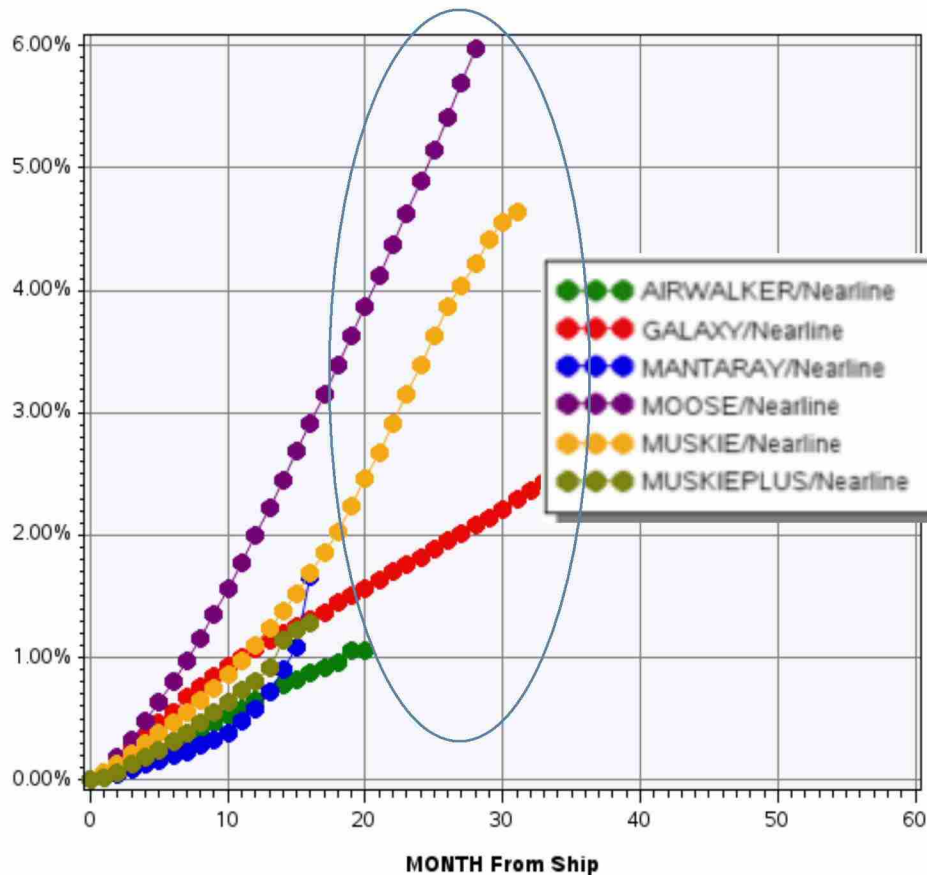
Mission Critical

1. Most NL and MC drives show increasing failure rate with time in field.

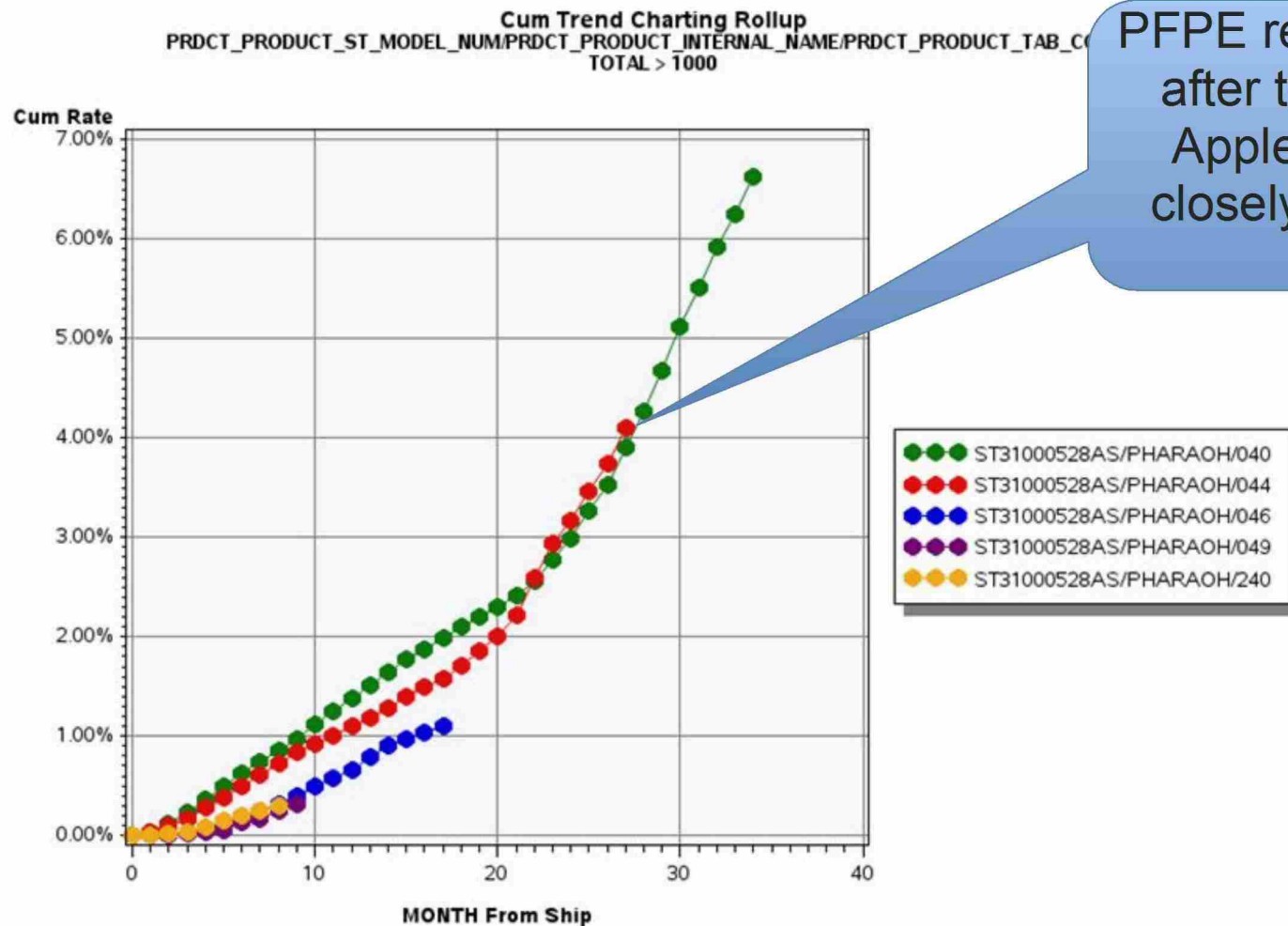# Client segment return rates *(all customers combined)*

Notebook

Desktop

Client curve shows Beta <1. However
1. Increasing OEM Warranty terms to 3 yr and disty to 2 years will increase beta.
2. Beyond 3yrs the returns drop significantly because of warranty terms (max 3yrs)
3. Tonka/Nighthawk & Crockett show the entitlement to 2% CRR over three years
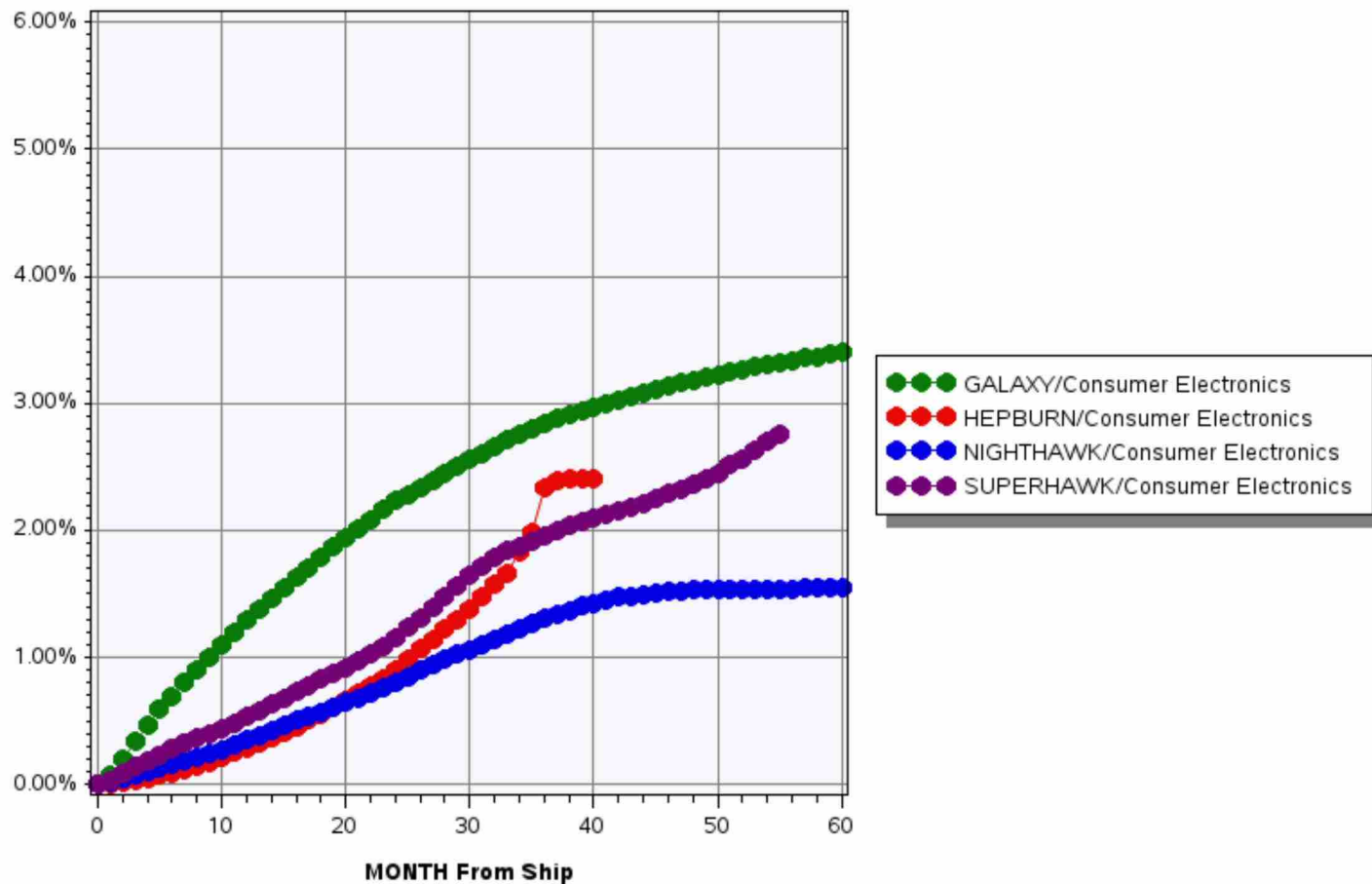
Pharaoh Apple field returns

Cum Trend Charting Rollup
PRDCT_PRODUCT_ST_MODEL_NUM/PRDCT_PRODUCT_INTERNAL_NAME/PRDCT_PRODUCT_TAB_C
TOTAL > 1000

PFPE related failure mode after two years in field. Apple runs hotter and closely tracks customer returns

Legend:
- ST31000528AS/PHARAOH/040
- ST31000528AS/PHARAOH/044
- ST31000528AS/PHARAOH/046
- ST31000528AS/PHARAOH/049
- ST31000528AS/PHARAOH/240

Y-axis: **Cum Rate** (0.00% – 7.00%)
X-axis: **MONTH From Ship** (0 – 40)

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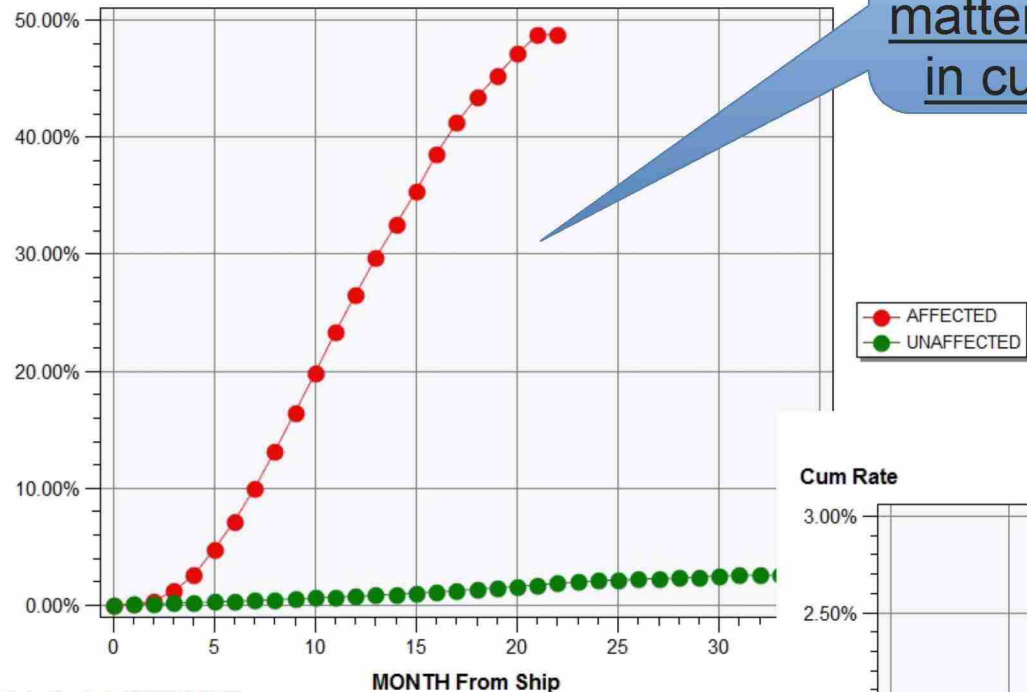# CE segment field return rate

Although we are best in class in DVR segment, starting to see late year accelerating failure date on Hepburn (Pharaoh class). FA underway. SONY DVR field return data shows the same.

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Eagle SV602 excursion

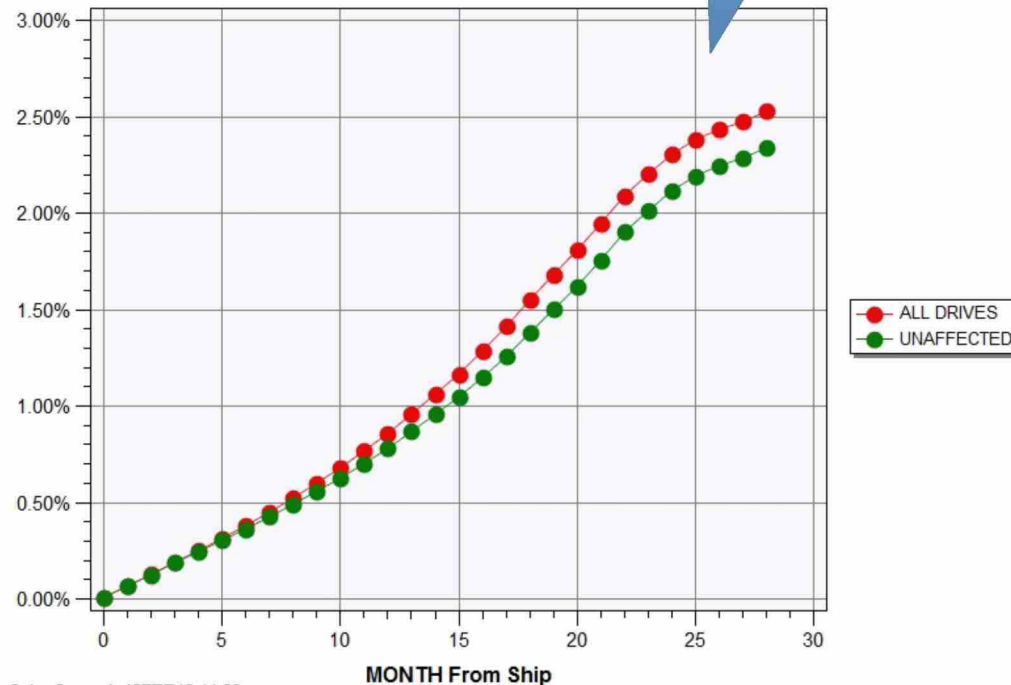**Eagle SV602 Affected vs. Unaffected CRR**

New mindset: Every excursion/margin matters. Put yourself in customer shoes

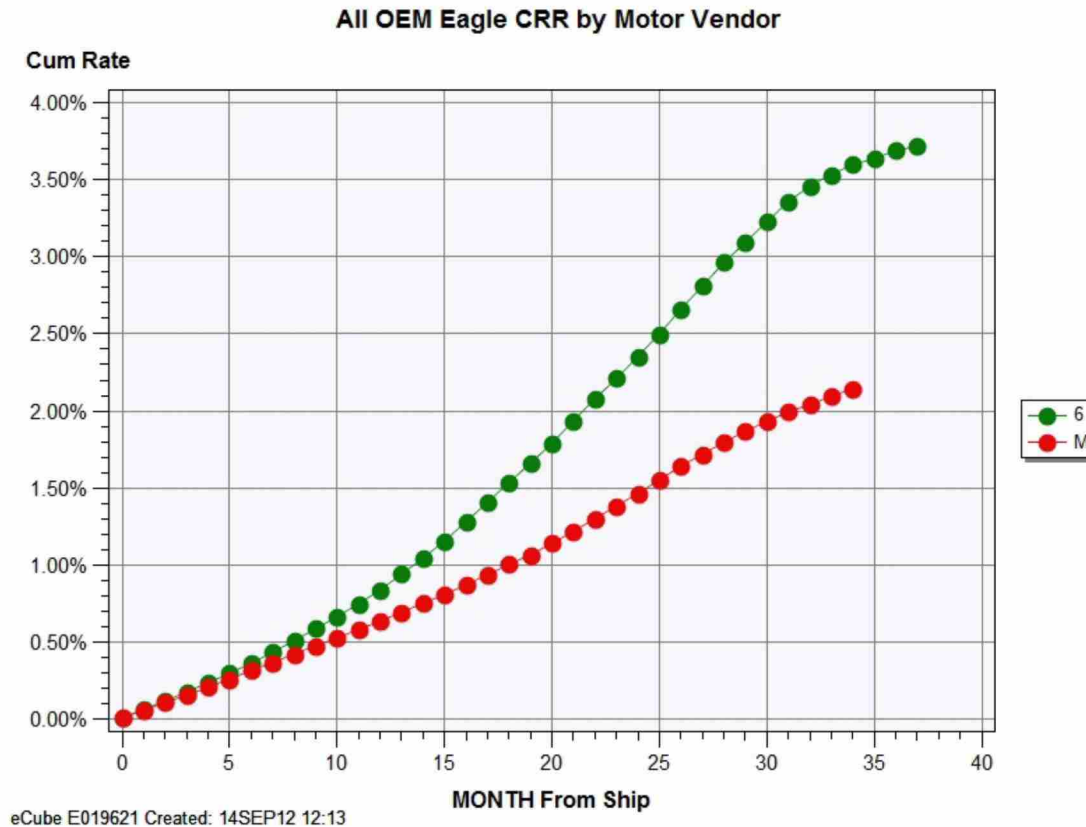**Old mindset:** Solution to pollution is dilution
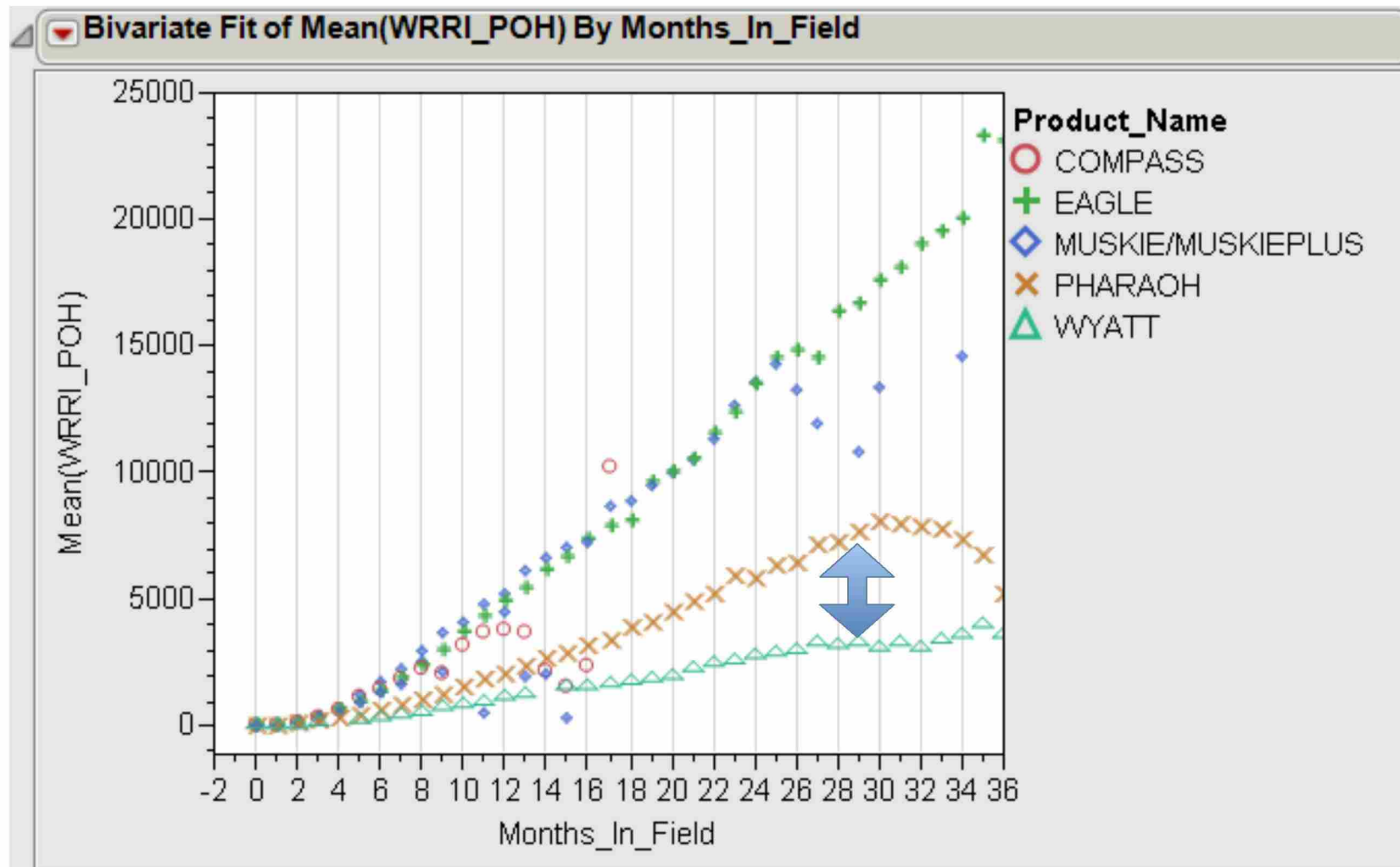
Eagle CRR With and Without SV602

1. Few days of supply chain excursions will cause havoc at certain customers

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Eagle CRR by NMB and Nidec

All OEM Eagle CRR by Motor Vendor

eCube E019621 Created: 14SEP12 12:13

1. Service life design and validation process should include critical component suppliers

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Mean(POH) vs months in field

Bivariate Fit of Mean(WRRI_POH) By Months_In_Field

Product_Name
- O COMPASS
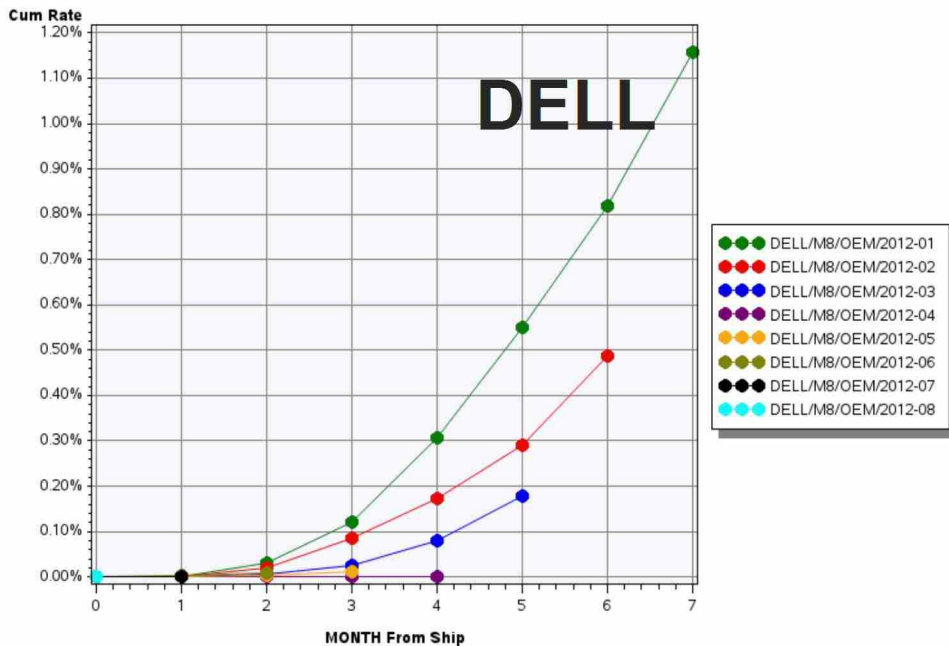- + EAGLE
- ◇ MUSKIE/MUSKIEPLUS
- X PHARAOH
- △ WYATT

1. It takes ~5 months for end user to start adding POH.
2. Don't be too optimistic based on early field return trends.

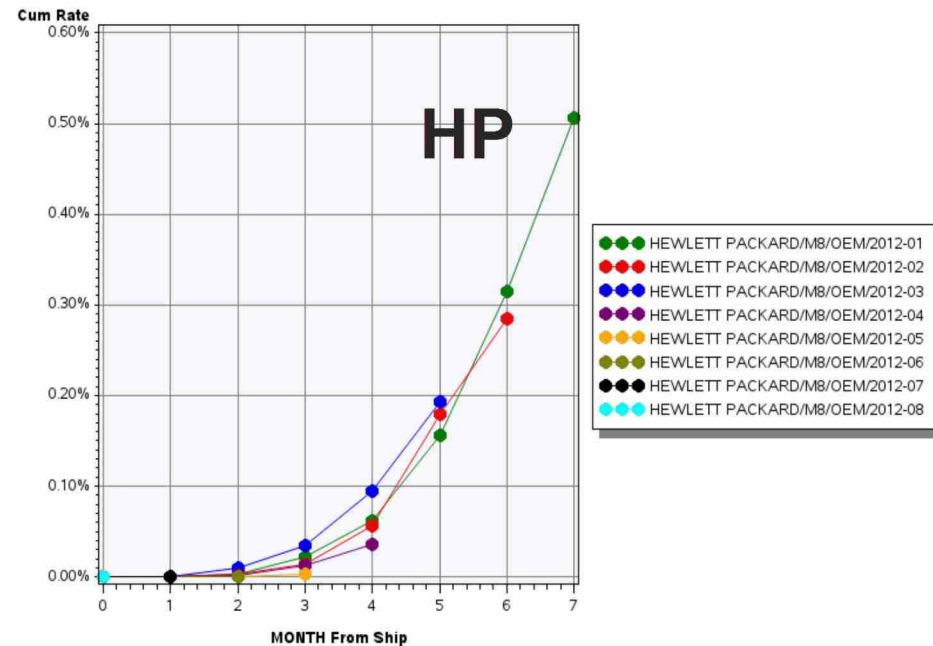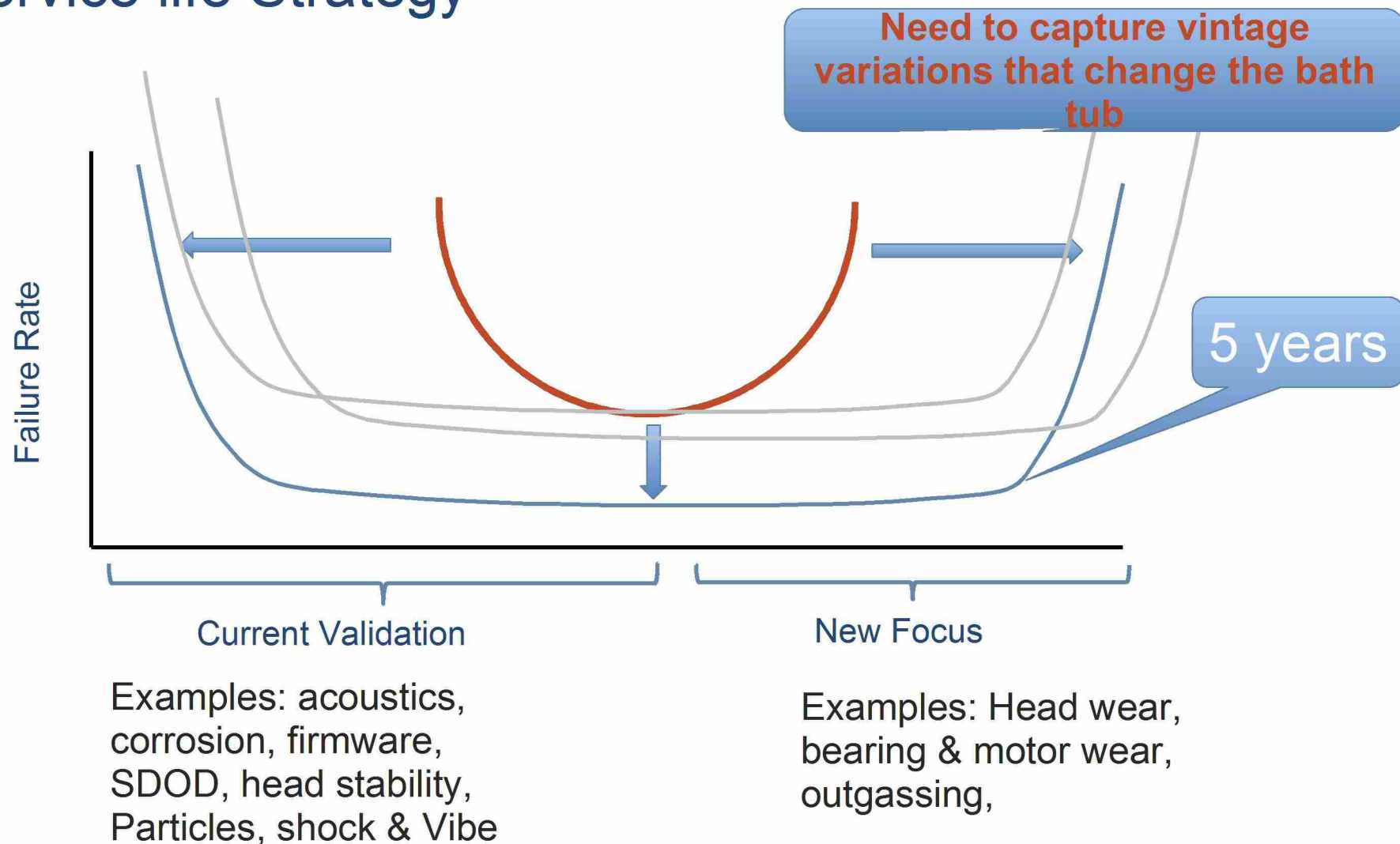# Early vintages are important ! (M8 example)

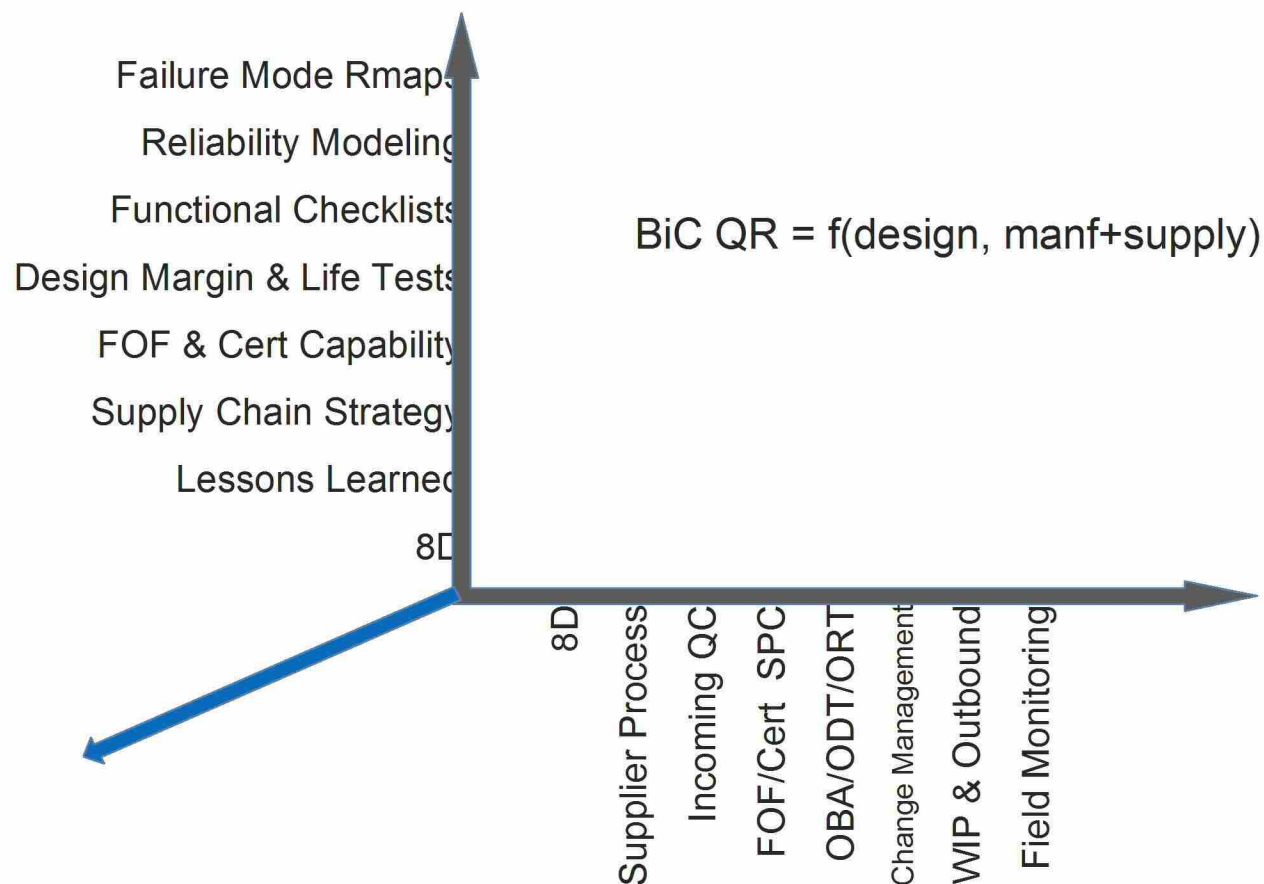Starting OEM ramp at high reliability is very important because

1. Positive impression on the product and will create more pull by customer SQEs
2. Early 'bad' vintages will stay on these CRR charts. They will continue to show accelerating failure rates, until EOL.
3. Easy excuse for customer SQEs to constantly hammer us ! Another excuse for customer procurement teams to ask for lower price !

Service life Strategy

Need to capture vintage variations that change the bath tub

5 years

Failure Rate

Current Validation

New Focus

Examples: acoustics, corrosion, firmware, SDOD, head stability, Particles, shock & Vibe

Examples: Head wear, bearing & motor wear, outgassing,

1. Design, validate and sustain a bath tub profile with low steady state failure rate and no degrading failure modes

2. Ideal service life business model: 1 day warranty and "deep & wide" bath tub profile

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Approach

1. Focus in development and supply chain processes

Failure Mode Rmaps
Reliability Modeling
Functional Checklists
Design Margin & Life Tests
FOF & Cert Capability
Supply Chain Strategy
Lessons Learned
8D

$$BiC\ QR = f(design,\ manf+supply)$$

8D
Supplier Process
Incoming QC
FOF/Cert SPC
OBA/ODT/ORT
Change Management
WIP & Outbound
Field Monitoring

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5Yr Service Life: Approach by function

Design: Define and eliminate KPIV of historical critical modes and potential modes due to new technologies. If cannot eliminate KPIVs identify control limits for all the KPIVs, to sustain 5 year service life

CEE: Model, test and predict to 5yr service life

Supply base: Component technology and processes to five year stress & margin. Plus tightly control supplier & sub-supplier KPIVs to critical modes.

Factory/QA: SPC & change management

CTS: Active field monitoring and management

PLM: Market share growth strategy with reliability as weapon

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5 year service life validation philosophy

Rich Segar
Sr. Director Customer Experience Engineering

October 8th, 2012

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Service Life Validation Philosophy

Define customer usage stress impacting service life.

Test to 90th+ percentile customer usage over 5 years for all field stress conditions.

Test drive margin for specific failure modes or environmental stresses should be equal to, or better than, previous generation of products and competition.

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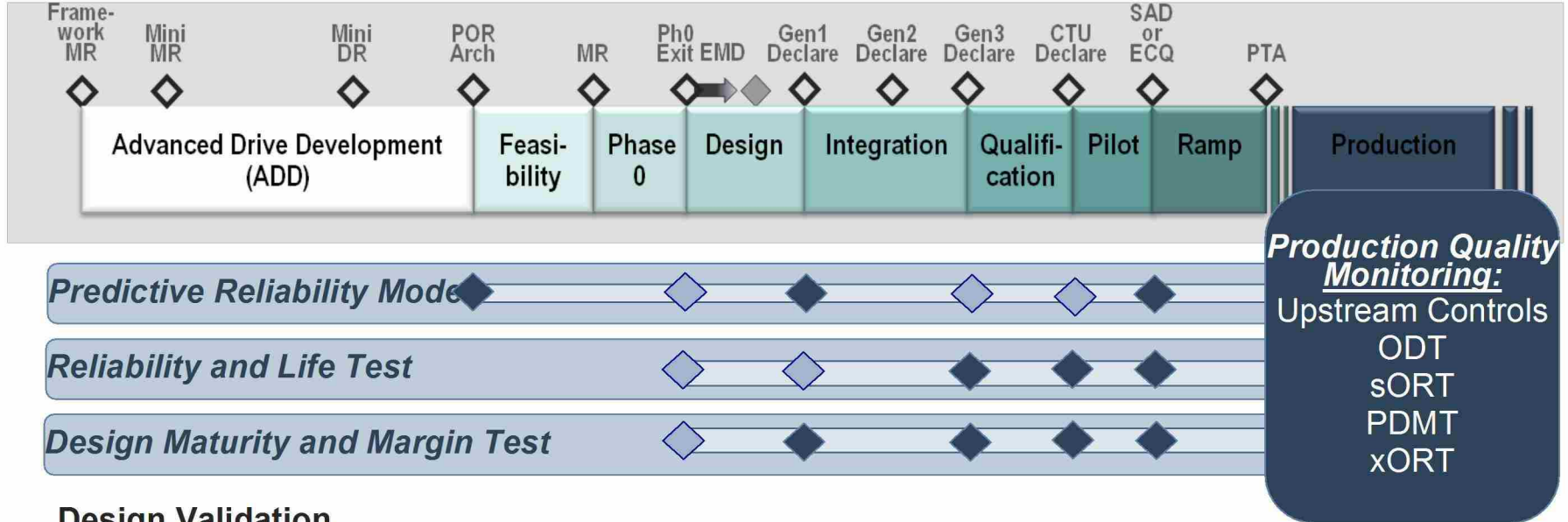# Customer Usage Example: MC W+R Stress
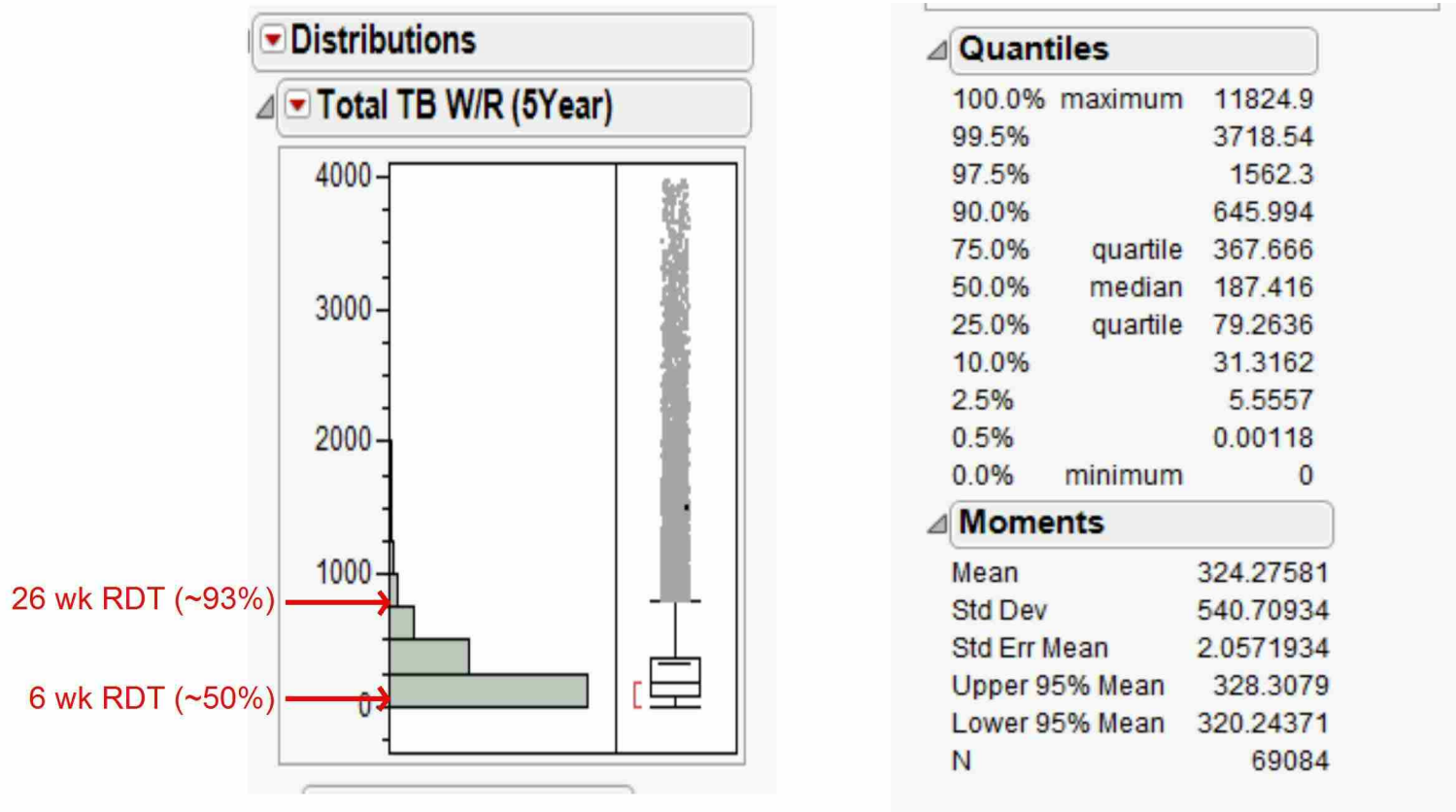
Assumes 5 TB/day (Lightning)
6week ORT = 210 TB
26week ORT = 910 TB

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Service Life Reliability System

Design Validation

Predictive Reliability Model – Predict and validate 5 year AFR failure modes

Reliability Test – Accelerated reliability testing for early field failures

   - *Life Testing* – Validate 5yr service life of drive through ext reli plus mode specific testing

DMT (Design Maturity Test) – Targeted failure mode and field stresses

   - *Stress Testing* – Compare margin to external stresses over previous products and competitors.

   - *Margin Testing* – Help establish process capability.

Production Quality Monitoring

ODT (Outgoing DPPM Test) – System integration test

sORT (Stress Ongoing Reliability Test) – 6 week accelerated stress test

PDMT (Periodic Design Maturity Test) – Test unique stress conditions every 6 weeks

xORT (Extended ORT) – Accelerated stress test for 5 year service life (26wk MC/NL/NLL)

*Future Focus: Refine upstream reliability KPIV controls*

Life Test Suite

Targeted Historical Failure Mode	5 yr Transfer Function
Spindle (drive)	✓
Spindle (component)	✓
Pivot (drive)	✓
Pivot (component)	✓
uAct/PZT (HGA)	✓
Flex Cable	✓
Crash Stop	✓
Single Head Stress Test	✓
TA Dwell (Dest/Non Dest)	✓
ASIC/DRAM/Preamp	✓
L/UL/Emergency Retract	✓
Outgassing	Future

System

Extended RDT	✓
Temp Cycle RDT	✓

Cohesive view of service life capability to guide product maturity decisions.

Continuously improving test suite incorporating customer usage, field stress, and future technology failure modes.

Can we predict which products will have beta >1
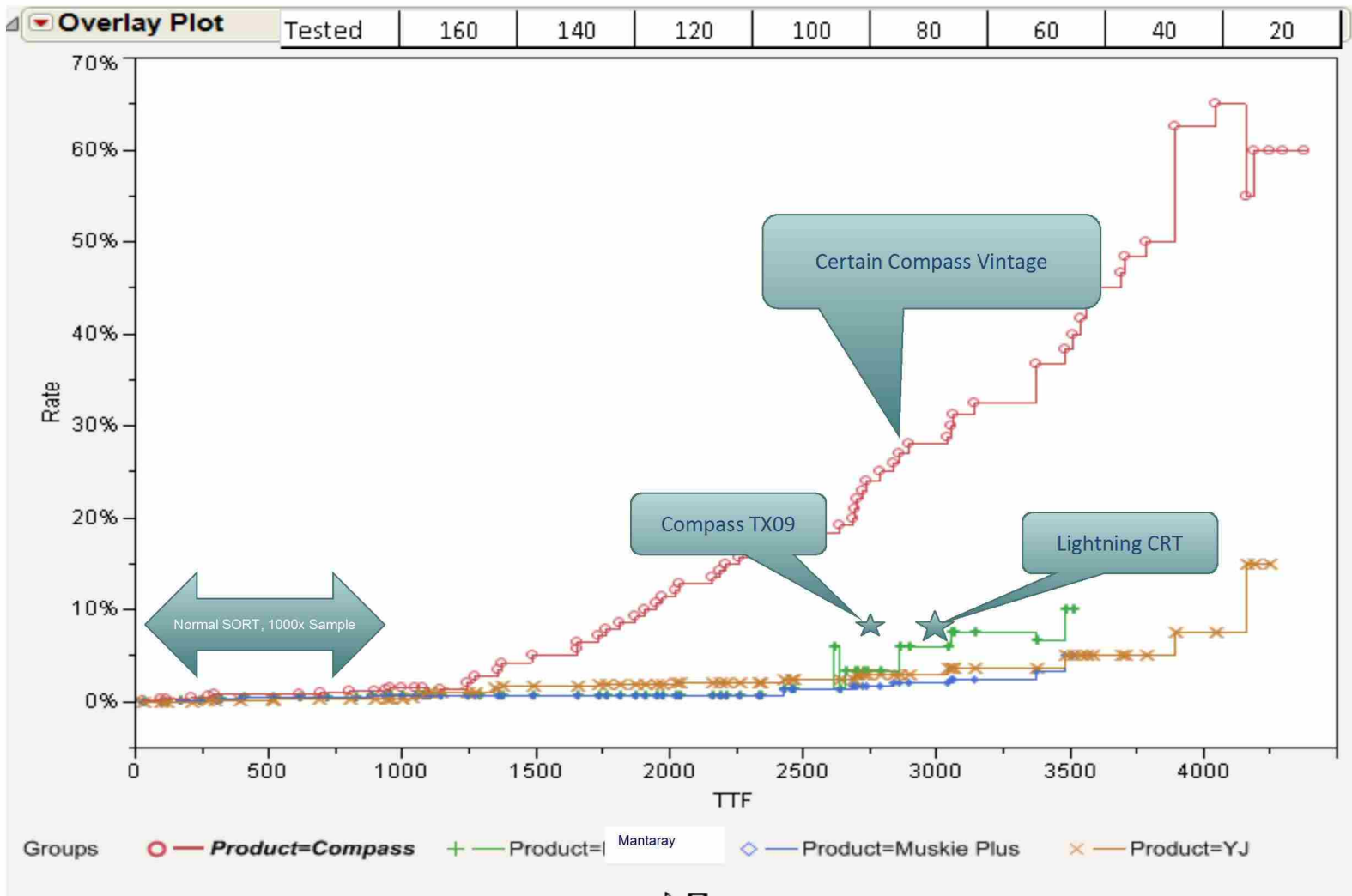
Above is example of XORT test ran up to six months that shows that Compass would have beta >1

Margin and Stress Testing

Definition

Test beyond bounds of operating state baselined to previous product and competitor.

Approach

- *Stress Environment*
  - Test design capability under high environmental stress conditions.
  - Current Test Plan: Altitude, Power, Shock, Rot Vibe, Temperature, Storage
- *Process Variation*
  - Test design capability beyond the nominal process target and capability.
  - Established Functional Design Tests: Clearance-DLC ladders, Cure rate profiles, MAT sliver builds, Contamination Doping

Methodology

- Test to failure
- Parametric analysis
- Test beyond specification
- Root cause understanding through FA and teardown

Goal

- Ship product which is equal to, or better than, previous generation products and competitors.

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Failure Mode Improvement Roadmap
Catalin Serpe

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Reliability Failure Modes Roadmap

Objective:

» Failure Modes Roadmap for top failure modes by market segment

KPIVs

» Technology roadmap
» Program changes
» Market requirements (usage /workload, operating conditions, etc.)
» Quantified impact of the technologies and changes to particular failure mode
  • use modeling, development tests (stress, 4 corner, margin) and reliability tests

KPOVs

» tool to monitor failure rate for top categories
» highlight gaps, identify trade offs
» help define decisions and priorities

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Field Reliability Prediction Model
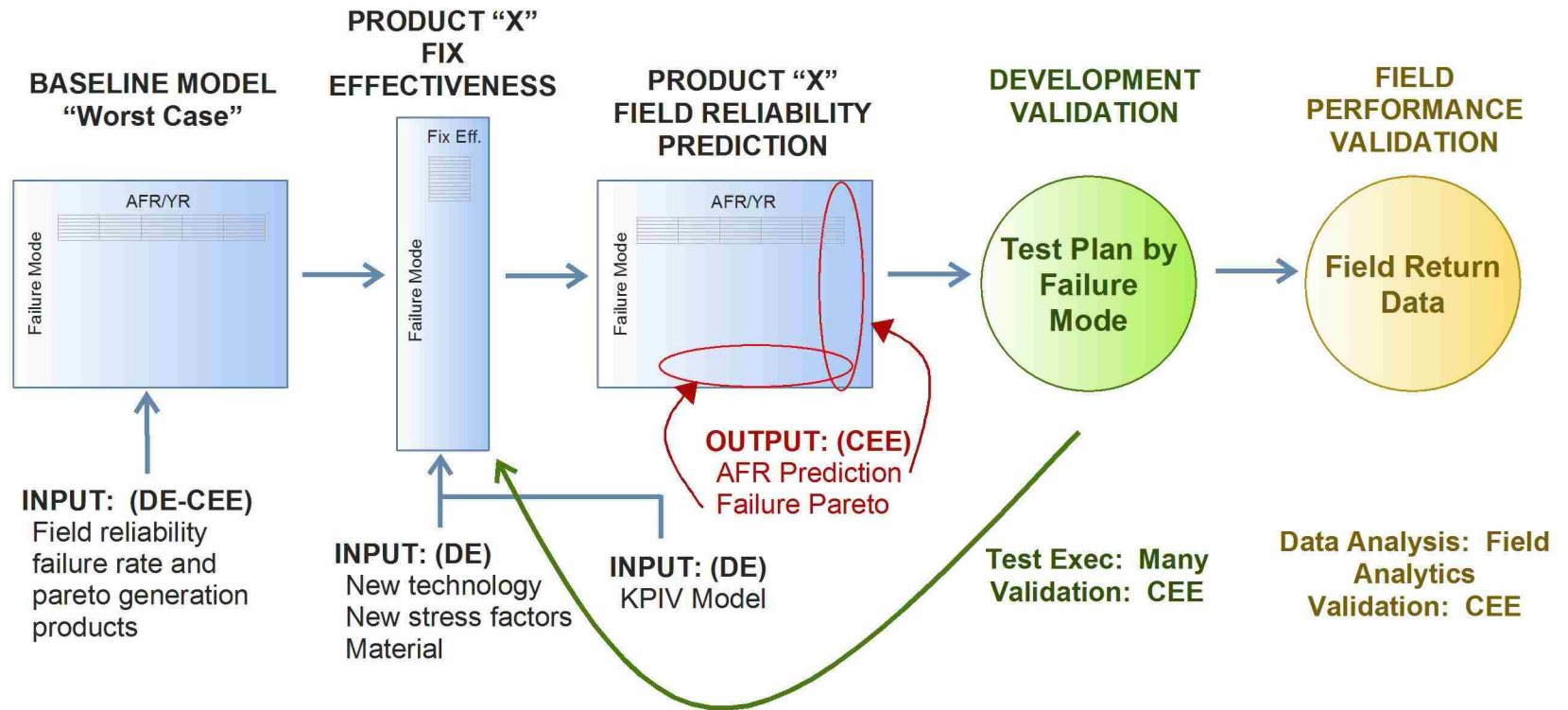
Model Development Validation:
 - Leverage existing design and PA test suite to assess design margin and validate the Field Reliability Model.

Lightning Field Reliability Prediction Model

Lightning Reliability Prediction Model - CTU update			Model Prediction, by year					Cumulative
Failure Category	AFR Source	CTU Effectiveness	1	2	3	4	5	
Head degradation	worst case (TF)	95%	0.100%	0.150%	0.150%	0.170%	0.170%	0.740%
HDI (Crashed drives, DNR...)	composite ARR	10%	0.085%	0.092%	0.090%	0.090%	0.090%	0.45%
NPF	composite ARR	5%	0.167%	0.078%	0.051%	0.037%	0.035%	0.367%
Spindle Motor	worst case	95%	0.036%	0.041%	0.053%	0.066%	0.080%	0.275%
CND	composite ARR	0%	0.060%	0.057%	0.047%	0.050%	0.050%	0.264%
Rd Instability	composite ARR	20%	0.032%	0.025%	0.028%	0.018%	0.000%	0.103%
Nano Contamination	worst case	50-67%	0.033%	0.007%	0.000%	0.000%	0.000%	0.039%
Particle damage	worst case	50-65%	0.013%	0.006%	0.005%	0.004%	0.004%	0.031%
Firmware	composite ARR	50%	0.013%	0.009%	0.006%	0.000%	0.000%	0.027%
Breather Filter	worst case	99%	0.000%	0.001%	0.010%	0.010%	0.005%	0.025%
Pivot Degradation	worst case	95% (est)	0.000%	0.001%	0.005%	0.006%	0.006%	0.018%
Handling Damage	composite ARR	60%	0.003%	0.003%	0.003%	0.008%	0.001%	0.018%
Media Process	worst case	90% (est)	0.010%	0.004%	0.000%	0.000%	0.000%	0.013%
Factory Process	worst case	95%	0.006%	0.006%	0.000%	0.000%	0.000%	0.013%
ASIC Motor Controller	composite ARR	89%	0.004%	0.001%	0.000%	0.000%	0.000%	0.004%
Other	composite ARR	0%	0.088%	0.066%	0.069%	0.070%	0.070%	0.363%
Target ARR = 0.73% per year		Predicted ARR	0.65%	0.55%	0.51%	0.53%	0.51%	2.75%

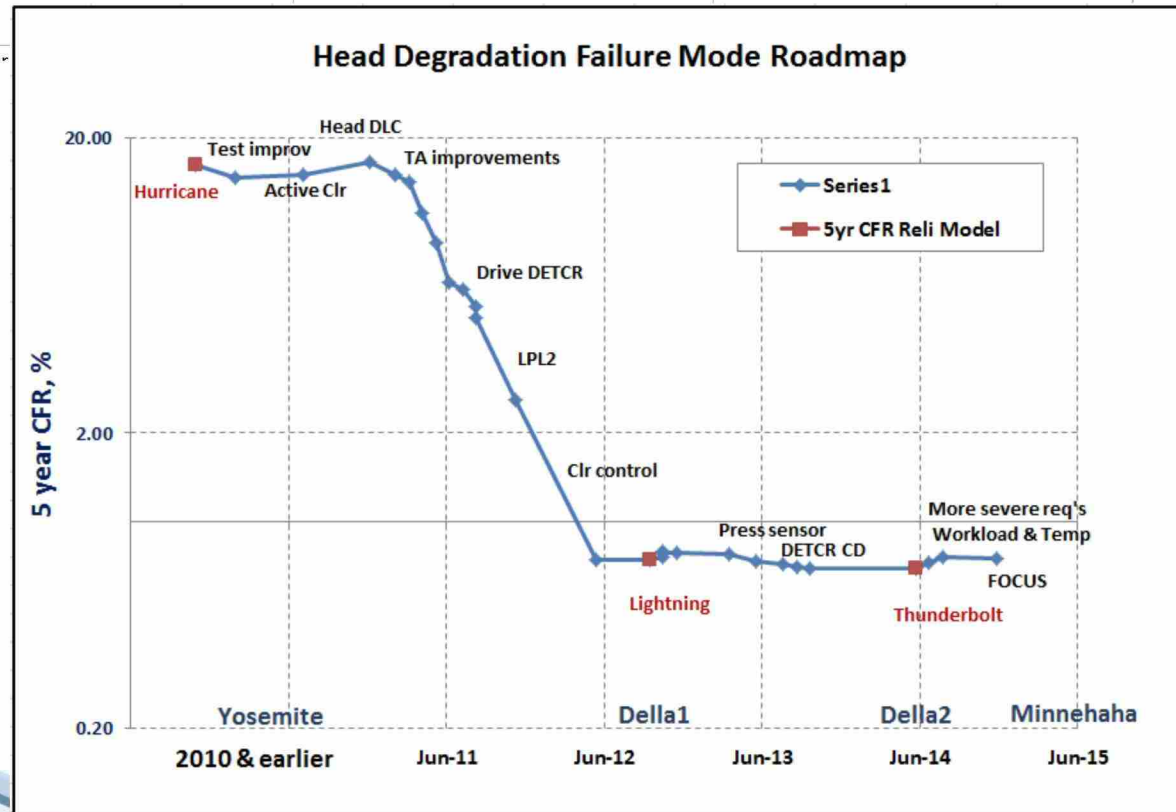**CTU update:** all categories verified with most recent test results to validate the effectiveness of changes

Note: HDI, NPF and CND are ~40% of the model budget – need further attention

Lightning Reliability Prediction Model will be finalized at SAD.

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Head Degradation Failure Roadmap

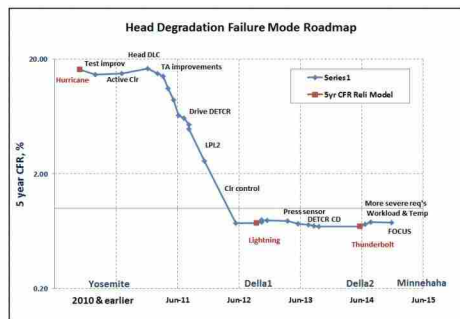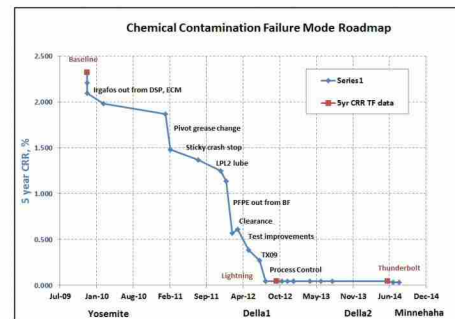| Platform	Yosemite	Della1		Della2	Minnehaha
Failure Mode	**CY11 and earlier**		**CY12**	**CY13**	**CY14 +**
• **Head Degradation**	• Test improvements (SHST, TA Dwell, sORT) • Active clearance [-] • Head DLC [-] • MDW DETCR • Humidity Sensor • TA media process improvements • BER delta & Burnish specs • Drive DETCR TA detection and padding • Dual Heater • Writer geometry (protrusion and cntct area) • Lower ABS Temp • LPL2 Lube		• Clearance Control (code, close point, …) • Active clearance [-] • Head DLC [-] • Digital Humidity Sensor • Digital Pressure Sensor • DETCR Cal • Gen2 overcoats	• DETCR Live Sensor • DETCR Contact Detection /IPD3 • Writer Config changes • Reader Config changes • Della3 TM changes • Operational temp requirements [-] • Workload increase [-]	• FOCUS • HAMR • SMR • FAFH • LCT AAB ? • Active clearance [-] • Head DLC [-]
• Spindle Motor	• Redesign for				coating (Self Assembled Monolayer)

Head Degradation Failure Mode Roadmap

ES Failure Modes Roadmap

Alignment model to upstream systems

Best in Class Customer experience

DRIVE LEVEL (5Yr Validation)

DRIVE

LIFE TEST   **MARGIN TEST**

- Failure Modes to capture 5Yr Stress
- Margin to Environmental & Field Stress

SUB-SYSTEM/
DRIVE FUNCTIONAL

| SAMS | FIRMWARE | HDM | RSS | ASIC |

COMPONENTS/
SUPPLIERS/
PROCESSES

| MDW Suspension Mechanical Assembly Process | Servo CF Customer Code PCO | Heads Media | Channel SOC PCBA |
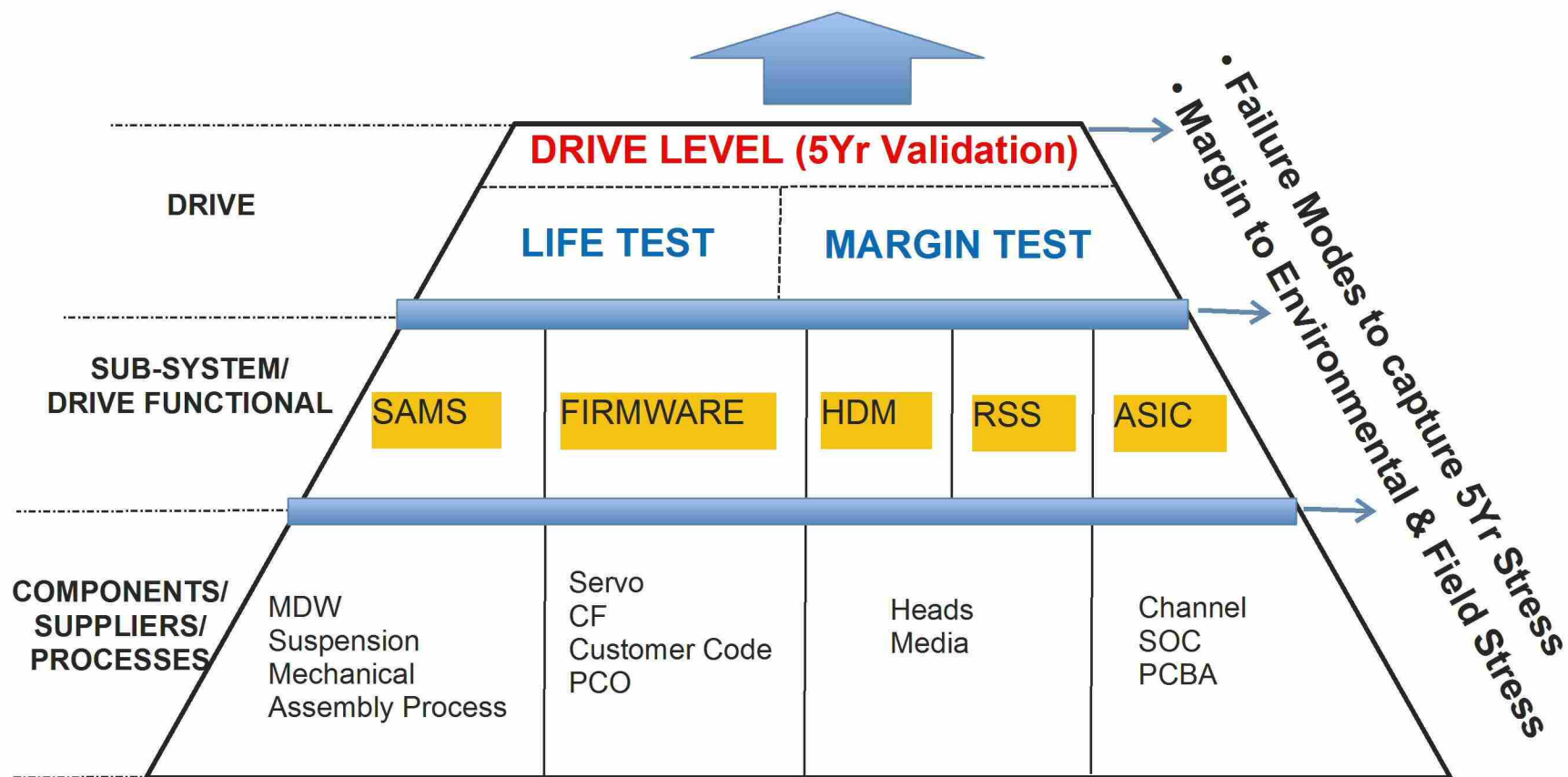
1. Need alignment between component level, subsystem level and drive level service life validation and margin comparison process
2. **Above alignment has to happen during all stages of product life (ATD to EOL)**

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In Conclusion

1. Achieving best in class 5 year service life performance is imperative for growth in Seagate's market share

2. Design, Validation and Sustaining processes/functions should align to cumulative 5 year stress and focus on margin improvement and variation

3. Need to establish measures, processes and interlocks between reliability process (customer experience) and other functions such as technology development, supplier development, PLM etc.

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Backup

5Yr Service Life: Design Approach (proposal)

Strategy: Define and Eliminate KPIVs for critical failure modes

- Subsystem model:
  - Key goal is to understand Physics of failure for all critical failure modes
  - Define all KPIVs and potential failure modes for new technologies
- Eliminate KPIVs for existing modes
  - Focus on eliminating the KPIVs.
  - Shared ownership of failure mode improvement roadmap
- System FMEA on new technologies to drive actions across company
  - Today new tech FMEAs do not drive strategic actions across the value stream.
  - This process should provide list of KPIVs and potential failure modes
- Leading Supply chain team
  - List of KPIVs that we want supply team to control to preSAD/RDT levels.
  - If supply team cannot meet the required levels, need to validate the 3 sigma corners.

- Development work (design, reliability and supplier dev teams) is not complete until KPIVs and KPOVs (physics of failure) of critical modes are identified, eliminated (or control process in place) and validated.

5Yr Service Life: CEE team

Strategy: Plan, test to margin and validate 5yr service life

- Systems model for 5 years
  - Inputs from functional teams/models and project 5 year performance
  - Life test report at key product life cycle/checkpoints.
- Fail Mode Improvement Roadmap
  - 3year mode specific improvement plan (tech alignment)
  - Closer engagement with platform team
- Shared ownership of new technology FMEA
  - Help implement closure of actions to eliminate KPIVs and control KPIVs
- Design margin & life test validation
  - Life validation tests (six month RDTs)
  - Mode specific five year life tests (SHST, bearing life etc etc)
  - Environment specific test to failure (HALT, TVM etc)
- Define/understand customer usage/stress
  - Work with PLM to improve product specifications
  - Resources and process to understand customer profiles, stresses, early warnings

- **Product assurance process is not complete until five year service life failure rate validation is complete**

5 year service life: Ops team

1. ## SPC…

   1. Stop if there is any change in your processes. Don't rationalize to use it or classify as low risk

2. ## Need to improve our change management process

   2. Lump all changes to a monthly or qtrly blockpoint type evals
   3. Do rigors FMEA
   4. Make all changes transparent (in all parts of the supply chain)

- **Will finalize OPS function proposal end of Oct**

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5Yr Service Life: SQE proposal

Strategy: Tightly control supplier/sub-supplier KPIVs to critical modes.

- Motor & Bearing
  - No Oil Leak plan for all programs
- Contamination Roadmap
  - Alignment of supplier contam roadmap to drive sensitivity to organic/inorganic compounds.
  - Roadmap has to be on the KPOVs defined by design teams
- Component KPOVs
  - Control KPOVs defined by design team to the SAD demonstration levels
  - Develop process KPIVs to help manage the KPOV levels

- Transition of suppliers in support of a "No Touch" and less operator dependent process initiatives.

- Will build on this proposal at SQE strategy forum.

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ES Field and supply disruption issues

- **Hurricane:** TA, bearing hydrocarbon, stator wire contam, cone scratch

- **Timberland:** System Zone Dwell

- **Maverick/Firebird:** Breather filter, Pivot contam

- **Firefly:** Breather filter

- **Eagle:** TA, SV09 media, bearing hydrocarbon, stator wire contam, cone scratch

- **Compass:** Gasket Thixotrope

- **15k4:** Motor oil hydrolysis

- **Moose:** TA related degradation, Firmware

- **Muskie:** TA related degradation

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NB Field and supply disruption issues

- **Wyatt:** Wrong Sector Timing (Firmware), Weak Write (narrow writer), Acoustics Noise (head switch servo bug), MBA Hydro-carbon, Silane Outgas from TIM (Long Term Storage)

- **Holliday:** Weak Write (lazy writer)**,** Acoustics Noise (head switch servo bug), Silane Outgas from TIM (Long Term Storage)

- **Desaru2D:** Weak Write (RHO Head, Lube pickup), Offset Write due to FW bug**,** Talc (Mg/Si/O) Contamination

- **Sapta15:** Head Degraded (Clearance related), cracked capacitors and PCBA to MBA tolerance issues

- **Julius:** Dell Slow Performance (FW bug, desktop only), SDOD (lift tab under ramp)

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DT & DVR Field and supply disruption issues

- **Grenada** : NHK particulate contamination, Head instability, DSP tolerance to MBA

- **Hepburn:** Sticky crash stop

- **Bogart:** Media cache corruption

- **Pharaoh:** Sticky crash stop, Command timeout at Iomega, Incorrect firmware (RQC @HP), PFPE escalation (RQC @ Apple)

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5Yr Service Life: Mech SQE

Strategy: Tightly control supplier/sub-supplier KPIVs to critical modes.

- Motor – No Oil Leak plan for all programs in volume and design.

- Bearing Cartridge – New Bearing Grease, development, qualification and implementation plans.

- Contamination Roadmap – Alignment of supplier contamination roadmap to Head / Disc sensitivity to organic and inorganic compounds.

- Transition of suppliers in support of a "No Touch" and less operator dependent process initiatives.

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Total Read plus Write TB's Comparison (by segment)

SORT Product	Field Product	6 Week SORT	26 Week SORT	Field Median @ 5 years	Total Read plus Write Tera Bytes Field 90th percentile @ 5 years	Field 95th percentile @ 5 years	Field 97.5th percentile @ 5 years
Compass	Firefly	163.8	709.8	137.1	805.5	1323.1	2136.7
Eagle	Eagle	176.4	764.4	130.8	406.9	556.6	804.4
Hornet	Hornet	155.4	673.4	93.6	968.7	2098.7	3301.8
Airwalker	Dragonfly	142.8	618.8	152.8	1088.2	1460	1987.3
Muskieplus	Muskie	151.2	655.2	328.5	1285.4	1870.6	2516.7

- MC 2.5" 10K : Compass SORT compared to Firefly Field
  - 6 Week SORT is equivalent to 55th percentile of field @ 5 years
  - 26 Week SORT is equivalent to 88th percentile of field @ 5 years

- MC 3.5" 15K : Eagle SORT compared to Eagle Field
  - 6 Week SORT is equivalent to 60th percentile of field @ 5 years
  - 26 Week SORT is equivalent to 97th percentile of field @ 5 years

- MC 2.5" 15K : Hornet SORT compared to Hornet Field
  - 6 Week SORT is equivalent to 62nd percentile of field @ 5 years
  - 26 Week SORT is equivalent to 87th percentile of field @ 5 years

- BC 2.5" 7.2K : Airwalker SORT compared to Dragonfly2 Field
  - 6 Week SORT is equivalent to 45th percentile of field @ 5 years
  - 26 Week SORT is equivalent to 82nd percentile of field @ 5 years

- BC 3.5" 7.2K : Muskieplus SORT compared to Muskie Field
  - 6 Week SORT is equivalent to 25th percentile of field @ 5 years
  - 26 Week SORT is equivalent to 76th percentile of field @ 5 years

1 TB = 2^40 bytes

Need this for NB, DT and CE. And ES w/ SORT2

Seagate